Louisiana Coastal Area (LCA), LA Ecosystem Restoration Study

Economic and Environmental Analysis Conference
13-15 April 2004

Wetland Loss

★Coastal Louisiana has lost 1.2 million acres of wetlands since 1932.

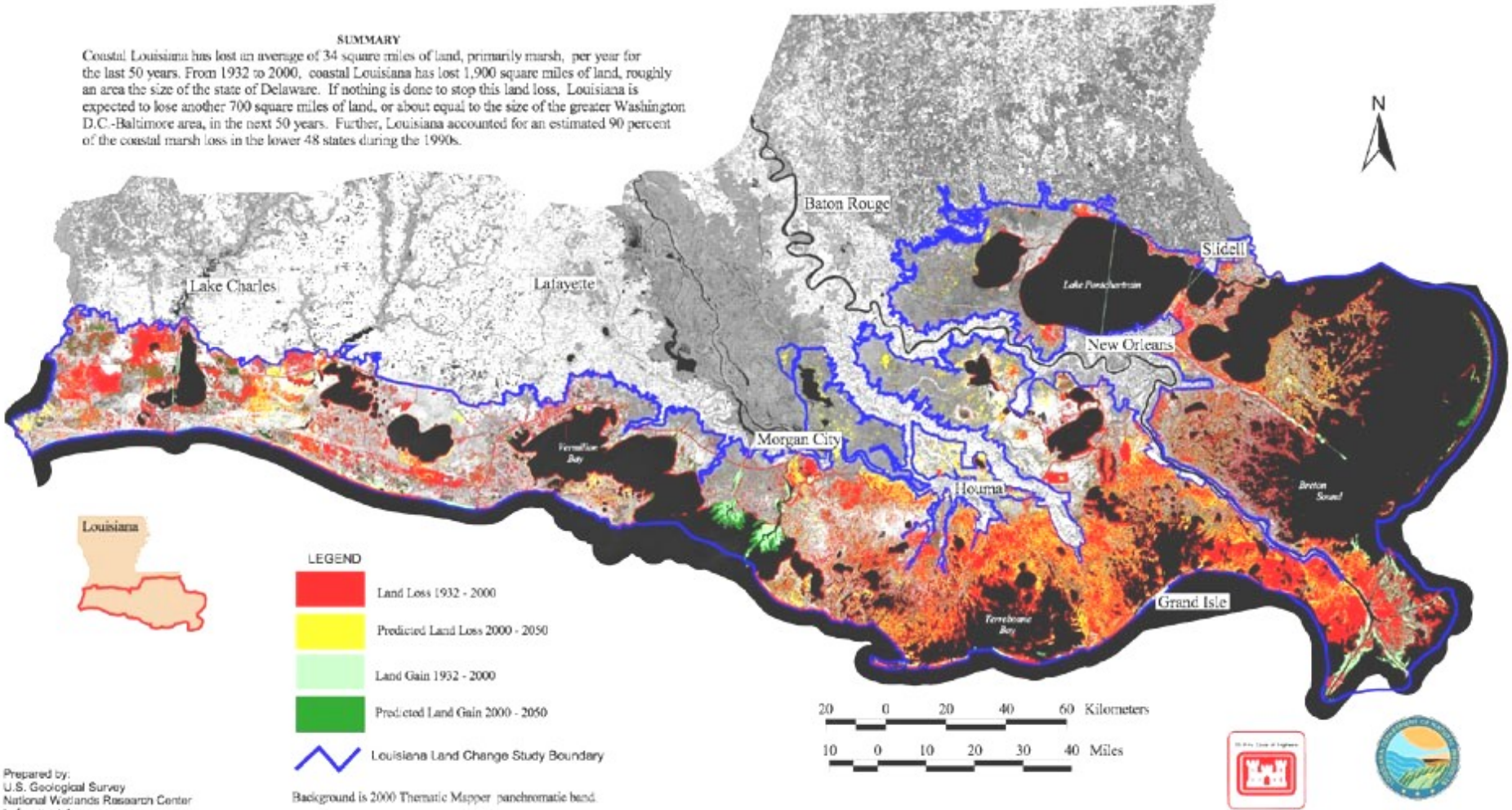
 Without action, another 430,000 acres could be lost in the next 50 years.

100+ Years of Land Change for Coastal Louisiana

USGS
science for a changing world

SUMMARY

Coastal Louisiana has lost an average of 34 square miles of land, primarily marsh, per year for the last 50 years. From 1932 to 2000, coastal Louisiana has lost 1,900 square miles of land, roughly an area the size of the state of Delaware. If nothing is done to stop this land loss, Louisiana is expected to lose another 700 square miles of land, or about equal to the size of the greater Washington D.C.-Baltimore area, in the next 50 years. Further, Louisiana accounted for an estimated 90 percent of the coastal marsh loss in the lower 48 states during the 1990s.



Background is 2000 Thematic Mapper panchromatic band.

Prepared by:
U.S. Geological Survey
National Wetlands Research Center
Lafayette, LA

Major Causes of Wetland Loss

- ★ Barrier island degradation
- Storms
- Salt water intrusion
- Canals
- Oil and gas development
- Levee systems
- Sediment reduction
- Sea level rise
- Subsidence

Plan Formulation Phase I

Planning Objectives

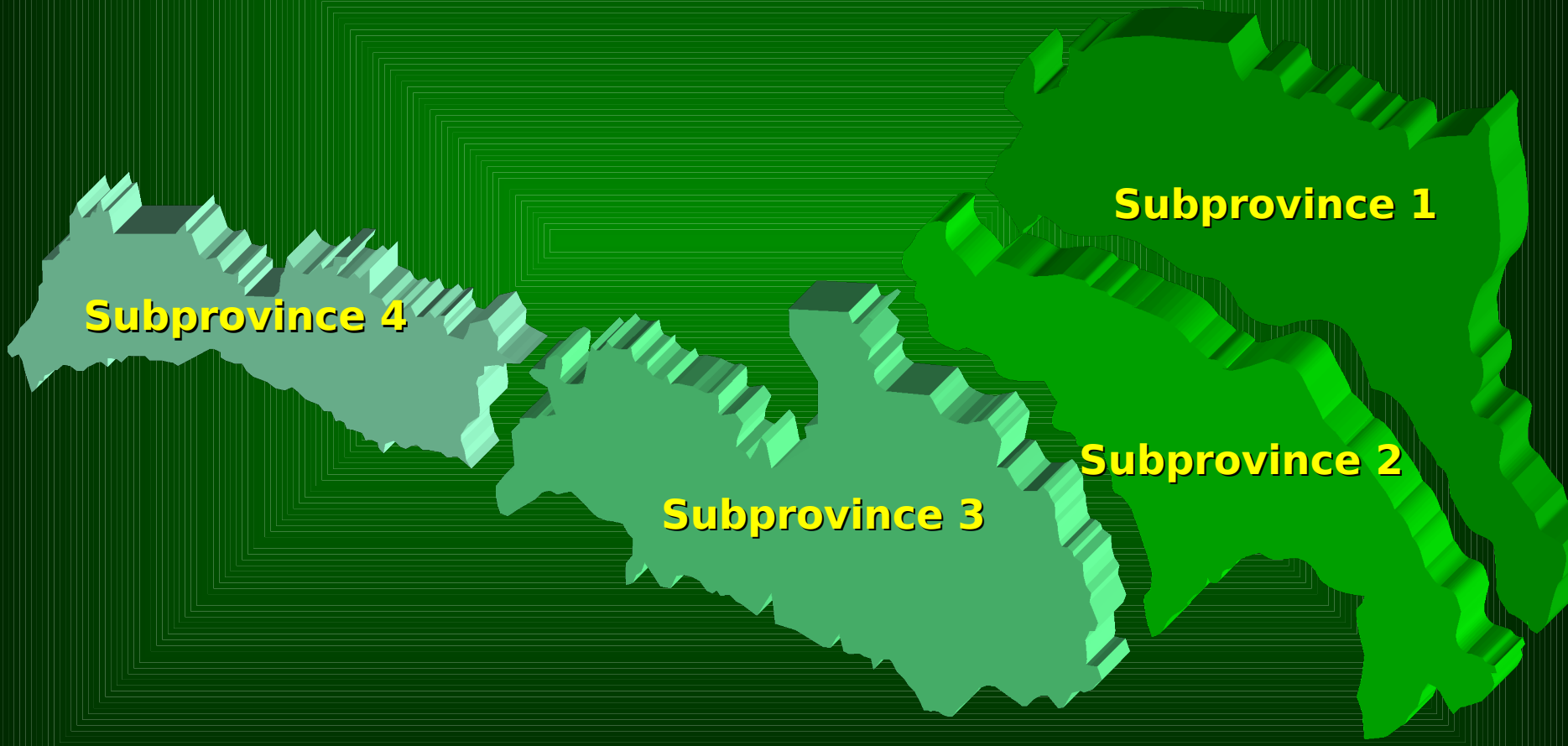
- **Ecosystem Objectives**
  - Improve productivity and sustain diverse fish and wildlife habitats
  - Reduce nutrient delivery to the Gulf of Mexico
- **Hydro-geomorphic Objectives**
  - Maintain or establish salinity gradients
  - Increase sediment input to the wetlands
  - Maintain or establish natural landscape features

Plan Formulation Phase I
Establish Evaluation Criteria

- ★ Habitat Suitability
- Land Building
- Nitrogen Reduction
- Economic Effects

Plan Formulation Phase I

Establish Subprovinces



Plan Formulation Phase II

Assess Restoration Strategies

★ **Summary of Coast 2050 Plan:**

- Initiative for ecosystem restoration
- Encompassed Louisiana's coastal area
- Grassroots planning effort
- Identified perceived problems of coastal Louisiana
  - Existing
  - Future to year 2050
- Contained a total of 88 broad-scale restoration strategies

Coast 2050 Strategies

Protect Shoreline
Keep shoreline in place in critical areas.
Maintain Shoreline Integrity
Let shore roll back, but prevent interior marsh erosion.
Maintain Sabine River Inflow
Maintain Atchafalaya Mudstream
Continue shoreline accretion along Chenier Plain.
Improve Hydrology/Drainage
Lower water levels in swamps. Allow more natural flow of water. Provide flood protection if necessary.
Reduce Sedimentation in Cote Blanche Bays and Vermilion Bay and Maintain as Brackish
Lower Water Levels
Modify flow patterns to tidal marshes to the south.
Move Fresh Water South into Tidal Marshes
Move Atchafalaya waters into tidal marshes. In Chenier Plain, use water from lakes to freshen southern brackish marshes.
Beneficial Use of Dredged Material or Dedicated Dredging
Create marsh in various sites along the coast.
Maximize Land Building in Atchafalaya Delta
Separate navigation from delta. Train lobe toward Four League Bay.
Maintain Land Bridges
Preserve the three land bridges to prevent marine forces from moving inland and large lakes from joining.
Small Diversions from Mississippi River (<5,000 cfs)
Allow river water and nutrients to nourish swamps and marshes. Flood protection where needed. Provide outfall management.
Optimize Atchafalaya Flow to West and East
Use Atchafalaya sediments and nutrients to preserve marshes.
Conveyance Channel from Mississippi River to Build Deltas
Build marsh and nourish adjacent wetlands in area of highest land loss.
Solve the Mississippi River Gulf Outlet Problem
Close MRGO when deep-draft container facilities are available on river. In interim, stabilize north bank, purchase oyster leases, create marsh in southern lobes of Lake Borgne.
Delta-building Diversions from Mississippi River (15,000-100,000 cfs)
Build marsh and nourish adjacent marsh. Address oyster issues.
Multi-purpose Control of Navigation Channels
Prevent saline waters from continuing to damage marshes to north. Retain fresh water.
Restore/maintain Barrier Islands, Headlands, Shorelands
Use most cost-effective means to protect these first lines of defense from storms.
Prevent Loss of Sediments into the Deep Gulf
Separate navigation from riverine processes. Build sediment trap and pump out to create marsh.
Coast 2050 Ecosystem Strategies

Plan Formulation Phase III

Develop and Evaluate Measures

- ★ Reviewed the Coast 2050 strategies
- Developed measures that could implement the strategies
- Developed design and cost of each measure
- Assessed the relative cost and impacts of the measures against each other

Plan Formulation Phase III

Develop and Evaluate Measures

Measure Type	Sub-province 1	Sub-province 2	Sub-province 3	Sub-province 4
Freshwater Diversion	21	30	1	
Sediment Diversion	21	18	1	
Dedicated Dredging	12	4	1	1
Salinity Control	1		2	16
Structure Modification	4	1		
Hydrologic Modification	1		12	4
Land Accquisition	1			
Barrier-shoreline Restoration	1	1	10	2
	62	54	27	23

TOTAL	166

Plan Formulation Phase IV

Formulation Themes

★ **Subprovinces 1 and 2**

- Minimize salinity changes
- Continuous reintroduction of flow
- Mimic historic hydrology

★ **Subprovince 3**

- Maximize Atchafalaya River flow
- Land building by delta development
- Introduction of Mississippi & Atchafalaya River flows

 Subprovince 4

- Large-scale salinity control
- Perimeter salinity control
- Freshwater introduction for salinity control

Plan Formulation Phase IV

Formulation Scales

- **Reduce: (50% decrease in rate of loss)**
- **Maintain: (No Net Loss)**
- **Increase: (50% Net Gain)**

Plan Formulation Phase IV

Subprovince Alternatives*

- Subprovince 1: 10 alternatives
- Subprovince 2: 10 alternatives
- Subprovince 3: 5 alternatives
- Subprovince 4: 7 alternatives

* Includes the No-Action Alternative for each Subprovince

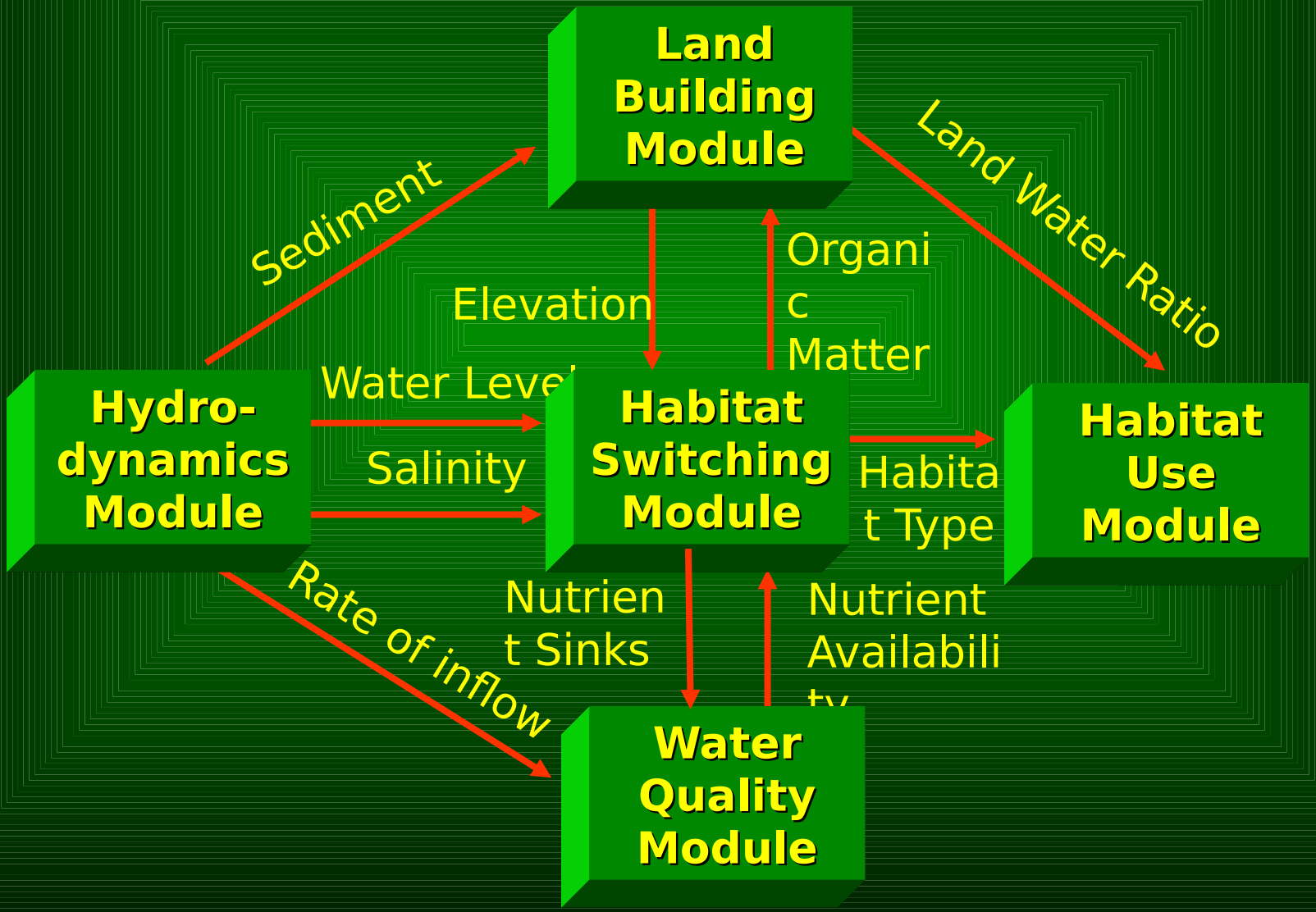
Plan Formulation Phase IV

Ecological Output Categories

- ★ Land-building and Nourishment
  - Total wetland/cell
- Vegetation Productivity
  - Value 0 to 1
- Habitat Types
  - Wooded Wetlands
  - Fresh, Intermediate, Brackish, & Saline Marsh
- 12 fauna
  - Suitability Index. Value 0 to 1
- Nitrogen Removed
  - Tons/year removed

Plan Formulation Phase IV

Ecological Modeling Relationships



Plan Formulation Phase IV

Economic Impact Considerations

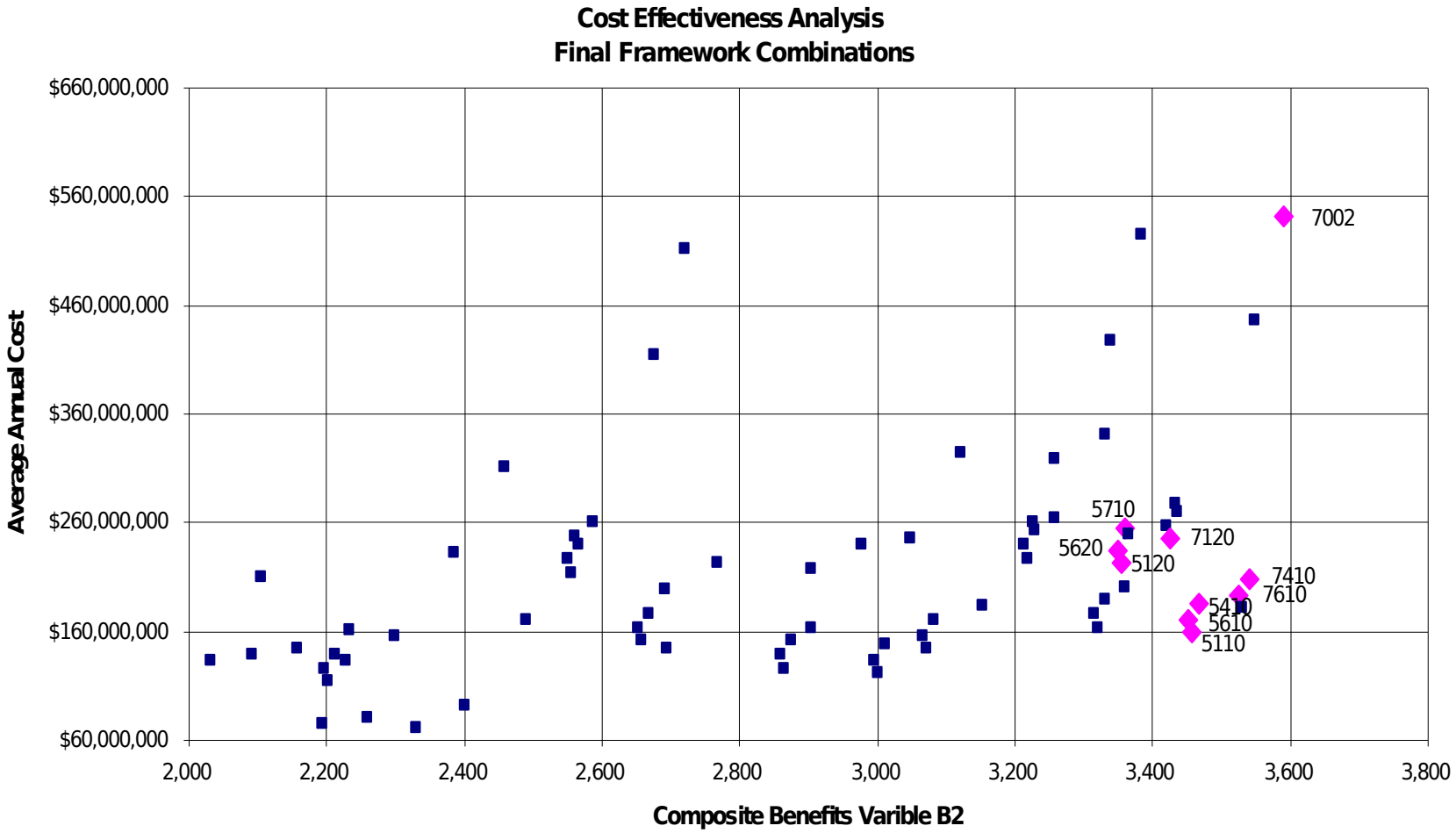
★ Impacts of plan implementation were estimated for plans with significant economic impacts (induced dredging and impacts to oyster leases)

 Impacts were estimated at a gross level, rather than at feasibility level

 Feasibility level projections of economic impacts will be produced in the project implementation reports produced in the next phase of the process

Plan Formulation Phase IV

System Framework



Plan Formulation Phase V

President's FY2005 Budget

1) In 2004, the Corps will work to issue draft report that identifies the **most critical ecological needs** and proposes a **near-term program** of **highly cost-effective projects** to address them.

   The report will also highlight the key **scientific uncertainties** and engineering challenges facing the effort to protect and restore the ecosystem, and propose **demonstration projects and studies** to help answer these questions.

   The report will focus on the specific **coastal areas** that **require** the most **immediate attention** and on the best ways to sequence the proposed work over the **next 10 or so years**, as we learn what works best.

Plan Formulation Phase V

President's FY2005 Budget

2) In 2004, the Corps will begin developing studies of potentially promising, **long-term ecosystem restoration concepts**, with the objective of determining whether they would provide a **cost-effective way** to create coastal wetlands.

3) An existing Federal-State Task Force established under 1990 legislation will increase its efforts to build and evaluate highly cost-effective fresh-water and sediment diversion projects.

Lessons Learned

- ★PDT Organization and Function
- Ecosystem Output Modeling
- Plan Formulation
- Stakeholder Involvement

Lessons Learned

- **PDT Organization and Function**
  - **Vertical Team**
  - **Collocated PDT**
  - **LCA Study Teams**

Collocated PDT

New Orleans District :

- 4 Environmental
- 1 Economist
- 1 Cost Engineer
- 1 Hydraulic Engineer
- 1 Geotechnical Engineer
- 2 Design Engineers
- 4 Project Managers

Agencies :

- 3 LADNR
- 2 EPA
- 1 USFWS
- 2 NOAA-NMFS
- 2 USGS
- 2 ERDC
- 2 NRCS

Total Personnel = 28

Examples of LCA Study Teams

Independent Tech. Review Team

Jacksonville District
- Planning
- Engineering
- Real Estate

LA Gulf Shoreline Restoration Advisory Board

Members
- Univ. New Orleans (Chair)
- LSU
- BTNEP
- Coastal Planning Inst.
- Boston Univ.
- USGS

USACE Coastal Engineering

Members
- MG Strock, USACE DCW
- BG Temple, USACE NAD
- BG Davis, USACE POD
- BG Castro, USACE SAD
- Edge, TAMU
- Ottman-Shay, Northwest Research Assoc.
- Taylor, Taylor Engineering

National Technical Review Committee

Ecology:
Day, LSU (Chair)
Whigham, Smithsonian
Fisheries:
Boesch, UM

Simenstad, UW
- Coastal Hydrology:
Wells, UNC
- Water Quality:
Mitsch, OSU
- River Engineering:

Watson, CSU
- Economics
Shabman,

Framework Development Team

Chair: LA DNR
Members:
- NRCS
- EPA
- USFWS
- NMFS
- MVN
- MVD
- COE HQ
- Env. Groups
- Academics
- State Reps

Lessons Learned

★Ecosystem Output Modeling

- Science Team and Program
- Inventory Existing Models
- Existing Models may not match your needs
- Consistent resolution, scale, and assumptions

Lessons Learned

- **Plan Formulation**
  - **Set clear study objectives**
  - **Emphasize public participation**
  - **Manage the number of alternatives**

Lessons Learned

- **Stakeholder Involvement**
  - **Shared responsibility**
  - **Early and continuous**
  - **Meetings with specific stakeholder groups**

LCA Points-of-Contact

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